

Dr. Dominic Breit
Associate Professor
Department of Mathematics
Heriot-Watt University
Riccarton Edinburgh
EH14 4AS – UK

List of publications

Theses

- 1) *Regularitätsuntersuchungen für das Ramberg/Osgood-Modell in drei Dimensionen.* **Diploma thesis**, Saarland University, Department of Mathematics. (2007; M. Fuchs, M. Bildhauer)
- 2) *Schätzung zeitstetiger Modelle in der Finanzmarktökonomie mittels EMM und GMM.* **Diploma thesis**, Saarland University, Department of Economics. (2008)
- 3) *Regularitätssätze für Variationsprobleme mit anisotropen Wachstumsbedingungen.* **PhD thesis**, Saarland University, Department of Mathematics. (2009; M. Fuchs, M. Bildhauer, N. Ural'tseva)
- 4) *Existence theory for generalized Newtonian fluids.* **Habilitation thesis**, LMU Munich, Mathematical Institute. (2013; L. Diening, J. Frehse, J. Málek, E. Süli)

Books

- 1) D. Breit: *Existence theory for generalized Newtonian fluids.* Mathematics in Science and Engineering. Elsevier/Academic Press, London, 286 pp. (2017)
- 2) D. Breit, E. Feireisl & M. Hofmanová: *Stochastically forced compressible fluid flows.* De Gruyter Series in Applied and Numerical Mathematics. De Gruyter, Berlin/Munich/Boston, 344 pp. (2018)
- 3) D. Breit & F. Gmeineder: *A course on function spaces.* To appear in Springer Universitext.

Articles in peer-reviewed journals

- 1) D. Breit: *The partial regularity for minimizers of splitting type variational integrals under general growth conditions I. The autonomous case.* **J. Math. Sciences** 166, No. 3, 239–258. (2010)
- 2) D. Breit: *The partial regularity for minimizers of splitting type variational integrals under general growth conditions II. The nonautonomous case.* **J. Math. Sciences** 166, No. 3, 259–281. (2010)
- 3) D. Breit: *A note on splitting-type variational problems with subquadratic growth.* **Arch. Math.** 94, 467–476. (2010)
- 4) D. Breit & M. Fuchs: *The nonlinear Stokes problem with general potentials having superquadratic growth.* **J. Math. Fluid Mech.** 13, 371–385. (2011)
- 5) D. Breit: *Splitting-type variational problems with x -dependent exponents.* **Ann. Acad. Sci. Fenn. Math.** 36, 279–289. (2011)
- 6) D. Breit, B. De Maria & A. Passarelli di Napoli: *Regularity for nonautonomous functionals with almost linear growth.* **Manus. Math.** 136, 83–114. (2011)
- 7) D. Breit, B. Stroffolini & A. Verde: *A general regularity theorem for functionals with φ -growth.* **J. Math. Anal. Appl.** 383, 226–233. (2011)
- 8) D. Breit: *New regularity theorems for non-autonomous variational integrals with (p, q) -growth.* **Calc. Var. & PDE** 44, 101–129. (2012)
- 9) D. Breit: *Regularity theory for superquadratic energy functionals related to nonlinear Hencky materials in three dimensions.* **J. Appl. Anal.** 18, 1–31. (2012)
- 10) D. Breit: *Analysis of generalized Navier-Stokes equations for stationary shear thickening flows.* **Nonlinear Anal.— Ser. A** 75, 5549–5560. (2012)
- 11) D. Breit, L. Diening & M. Fuchs: *Solenoidal Lipschitz truncation and applications in fluid mechanics.* **J. Diff. Eq.** 253, 1910–1942. (2012)
- 12) D. Breit & O.D. Schirra: *Korn-type inequalities in Orlicz-Sobolev spaces involving the trace-free part of the symmetric gradient and applications to regularity theory.* **J. Anal. Appl. (ZAA)** 31, 335–356. (2012)
- 13) D. Breit & L. Diening: *Sharp conditions for Korn inequalities in Orlicz spaces.* **J. Math. Fluid Mech.** 14, 565–573. (2012)
- 14) D. Breit & A. Verde: *Quasiconvex variational integrals in Orlicz-Sobolev spaces.* **Ann. Mat. Pura Appl.** 192, 255–271. (2013)
- 15) D. Breit, L. Diening & S. Schwarzacher: *Solenoidal Lipschitz truncation for parabolic PDEs.* **Math. Mod. Meth. Appl. Sci.** 23, 2671–2700. (2013)

- 16) D. Breit: *Smoothness properties of solutions to the nonlinear Stokes problem with non-autonomous potentials*. **Comment. Math. Univ. Carolin.** 54, 493–508. (2013)
- 17) D. Breit: *Regularity theory for nonlinear systems of SPDEs*. **Manus. Math.** 146, 329–349. (2015)
- 18) D. Breit, L. Diening & S. Schwarzacher: *Finite Element Approximation of the $p(\cdot)$ -Laplacian*. **SIAM J. Numer. Anal.** 53, 551–572. (2015)
- 19) D. Breit & A. Cianchi: *Negative Orlicz-Sobolev norms and strongly nonlinear systems in fluid mechanics*. **J. Diff. Eq.** 259, 48–83. (2015)
- 20) D. Breit: *Existence theory for stochastic power law fluids*. **J. Math. Fluid Mech.** 17, 295–326. (2015)
- 21) L. C. Berselli, D. Breit & L. Diening: *Convergence Analysis for a Finite Element Approximation of a Steady Model for Electrorheological Fluids*. **Numer. Math.** 132, 657–689. (2016)
- 22) A. Bensoussan, D. Breit & J. Frehse: *Parabolic Bellman-systems with mean field dependence*. **Appl. Math. Optim.** 73, 419–432. (2016)
(Special issue in memory of A. V. Balakrishnan)
- 23) D. Breit: *The \mathcal{A} -Stokes approximation for non-stationary problems*. **Quart. J. Math.** 67, 201–231. (2016)
- 24) D. Breit & M. Hofmanová: *Stochastic Navier–Stokes equations for compressible fluids*. **Indiana Univ. Math. J.** 65, 1183–1250. (2016)
- 25) D. Breit, E. Feireisl & M. Hofmanová: *Incompressible limit for compressible fluids with stochastic forcing*. **Arch. Rational Mech. Anal.** 222, 895–926. (2016)
- 26) H. Abels & D. Breit: *Weak solutions for a non-Newtonian diffuse interface model with different densities*. **Nonlinearity** 29, 3426–3453. (2016)
- 27) D. Breit, E. Feireisl & M. Hofmanová: *Compressible fluids driven by stochastic forcing: The relative energy inequality and applications*. **Commun. Math. Phys.** 350, 443–473. (2017)
- 28) D. Breit, A. Cianchi & L. Diening: *Trace-free Korn inequalities in Orlicz spaces*. **SIAM J. Math. Anal.** 49, 2496–2526. (2017)
- 29) D. Breit, B. Stroppolini & A. Verde: *Non-stationary flows of asymptotically Newtonian fluids*. **Commun. Contemp. Math.** 20, 1750006. (2018)
- 30) D. Breit, E. Feireisl & M. Hofmanová: *Local strong solutions to the stochastic compressible Navier–Stokes system*. **Commun. PDE** 43, 313–345. (2018)
- 31) D. Breit & S. Schwarzacher: *Compressible fluids interacting with a linear-elastic shell*. **Arch. Rational Mech. Anal.** 228, 495–562. (2018)

- 32) A. Bensoussan, D. Breit & J. Frehse: *Parabolic Bellmann equations with risk control*. **SIAM J. Control Optim.** 56, 1535–1549. (2018)
- 33) D. Breit, A. Cianchi, L. Diening, T. Kuusi & S. Schwarzacher: *Pointwise Calderón-Zygmund gradient estimates for the p -Laplace system*. **J. Math. Pures Appl.** 114, 146–190. (2018)
- 34) D. Breit & P. R. Mensah: *Stochastic compressible Euler equations and inviscid limits*. **Nonlinear Anal. – Ser. A** 184, 218–238. (2019)
- 35) D. Breit, E. Feireisl, M. Hofmanová & B. Maslowski: *Stationary solutions to the compressible Navier–Stokes system driven by stochastic forces*. **Probab. Theory Relat. Fields** 174, 981–1032. (2019)
- 36) D. Breit & F. Gmeineder: *Electro-rheological fluids under random influences: martingale and strong solutions*. **Stoch. PDE: Anal. Comp.** 7, 699–745. (2019)
- 37) D. Breit & E. Wahlén: *A variational approach to solitary gravity-capillary interfacial waves with infinite depth*. **J. Nonlinear Sci.** 29, 2601–2655. (2019)
- 38) D. Breit, E. Feireisl & M. Hofmanová: *Solution semiflow for the isentropic Euler system*. **Arch. Rational Mech. Anal.** 235, 167–194. (2020)
- 39) D. Breit, E. Feireisl & M. Hofmanová: *On solvability and ill-posedness of the compressible Euler system subject to stochastic forces*. **Anal. PDE** 13, 371–402. (2020)
- 40) D. Breit, L. Diening & F. Gmeineder: *On the trace operator for functions of bounded \mathbb{A} -variation*. **Anal. PDE** 13, 559–594. (2020)
- 41) D. Breit & E. Feireisl: *Stochastic Navier–Stokes–Fourier equations*. **Indiana Univ. Math. J.** 69, 911–975. (2020)
- 42) D. Breit, E. Feireisl & M. Hofmanová: *Dissipative solutions and semiflow selection for the complete Euler system*. **Commun. Math. Phys.** 376, 1471–1497. (2020)
- 43) D. Breit & P. R. Mensah: *Space-time approximation of parabolic systems with variable growth*. **IMA J. Num. Anal.** 40, 2505–2552. (2020)
- 44) D. Breit, E. Feireisl & M. Hofmanová: *Markov selection for the stochastic compressible Navier–Stokes system*. **Ann. Appl. Probab.** 30, 2547–2572. (2020)
- 45) D. Breit & P. R. Mensah: *An incompressible polymer fluid interacting with a Koiter shell*. **J. Nonlinear Sci.** 31, 25. (2021)
- 46) D. Breit & A. Dodgson: *Convergence rates for the numerical approximation of the 2D stochastic Navier–Stokes equations*. **Numer. Math.** 147, 553–578. (2021)
- 47) D. Breit & P. R. Mensah: *Local well-posedness of the compressible FENE dumbbell model of Warner-type*. **Nonlinearity** 34, 2715–2749. (2021)
- 48) D. Breit & T. C. Moyo: *Dissipative solutions to the stochastic Euler equations*. **J. Math. Fluid Mech.** 23, 80. (2021)

- 49) D. Breit, L. Diening, J. Storn & J. Wichmann: *The parabolic p -Laplacian with fractional differentiability*. **IMA J. Num. Anal.** 41, 2110–2138. (2021)
- 50) D. Breit, M. Hofmanová & S. Loisel: *Space-time approximation of stochastic p -Laplace systems*. **SIAM J. Num. Anal.** 59, 2218–2236. (2021)
- 51) D. Breit & A. Cianchi: *Symmetric gradient Sobolev spaces endowed with rearrangement invariant norms*. **Adv. Math.** 391, 107954. (2021)

Articles accepted for publication in peer-reviewed journals

- 52) D. Breit, L. Diening & F. Gmeineder: *The Lipschitz truncation for functions of bounded variation*. To appear in **Indiana Univ. Math. J.**
Preprint at <https://www.iuj.indiana.edu/IUMJ/Preprints/8742.pdf>
- 53) D. Breit, E. Feireisl & M. Hofmanová: *Stationary solutions in thermodynamics of stochastically forced fluids*. To appear in **Math. Ann.** Preprint at arXiv:2102.04178v1
- 54) D. Breit, A. Cianchi, L. Diening & S. Schwarzacher: *Global Schauder estimates for the p -Laplace system*. **Arch. Rational Mech. Anal.** DOI:10.1007/s00205-021-01712-w

Articles submitted for publication

- 55) D. Breit & S. Schwarzacher: *Navier–Stokes–Fourier fluids interacting with elastic shells*. Preprint at arXiv:2101.00824v1
- 56) D. Breit, E. Feireisl & M. Hofmanová: *On the long time behavior of compressible fluid flows excited by random forcing*. Preprint at arXiv:2012.07476v1
- 57) D. Breit, M. Kampschulte & S. Schwarzacher: *Compressible fluids interacting with 3D visco-elastic bulk solids*. Preprint at arXiv:2108.03042v1
- 58) D. Breit & A. Prohl: *Error analysis for 2D stochastic Navier–Stokes equations in bounded domains*. Preprint at arXiv:2109.06495v1
- 59) D. Breit & A. Prohl: *Numerical analysis of 2D Navier–Stokes equations with additive stochastic forcing*. Preprint at arXiv:2110.05894v1

Surveys, announcements & proceedings

- 1) D. Breit & M. Hofmanová: *On time regularity of stochastic evolution equations with monotone coefficients*. **C. R. Acad. Sci. Paris Ser. I** 354, 33–37. (2016)
- 2) D. Breit: *Existence theory for generalized Newtonian fluids*. in Recent Advances in Partial Differential Equations and Applications, **Cont. Math.** 666, Amer. Math. Soc., Providence, RI, 99–110. (2016)
- 3) D. Breit, A. Cianchi, L. Diening, T. Kuusi & S. Schwarzacher: *The p -Laplace system with right-hand side in divergence form: Inner and up to the boundary pointwise estimates*. **Nonlinear Anal.— Ser. A** 153, 200–212. (2017)
(Special issue for N. Fusco’s 60th birthday)
- 4) D. Breit: *An Introduction to Stochastic Navier–Stokes Equations*. In: M. Bulíček, E. Feireisl, M. Pokorný (eds) **New Trends and Results in Mathematical Description of Fluid Flows**. Nečas Center Series. Birkhäuser, Cham. (2018)
- 5) D. Breit, E. Feireisl & M. Hofmanová: *Generalized solutions to models of inviscid fluids*. **Discr. Cont. Dyn. Systems Ser. B** 25, 3831–3842. (2020)
- 6) L. C. Berselli & D. Breit: *On the existence of weak solutions for the steady Baldwin–Lomax model and generalizations*. **J. Math. Anal. Appl.** 501, 124633. (2021)

Selected talks

- 1) Studierenden-Konferenz, DMV-Tagung, **Erlangen–Germany**. (09/2008)
- 2) Hausdorff Centre for Mathematics, **Bonn–Germany**. (09/2009)
- 3) Department of Mathematics “R. Caccioppoli”, **Naples–Italy**. (03/2010)
- 4) Singular days on Asymptotic Methods for PDEs, **Berlin–Germany**. (04/2010)
- 5) Dynamical Systems, Differential Equ. & Appl., **Dresden–Germany**. (05/2010)
- 6) Ludwig-Maximilian-University, **Munich–Germany**. (11/2010)
- 7) British Applied Mathematics Colloquium, **Birmingham–UK**. (04/2011)
- 8) Oxford Centre for Nonlinear PDE, **Oxford–UK**. (05/2011)
- 9) IMA Conference: Nonlinearity & Coherent Structures, **Reading–UK**. (07/2011)
- 10) Equadiff 2011, **Loughborough–UK**. (08/2011)
- 11) University of Lund, **Lund–Sweden**. (02/2012)
- 12) Charles University, **Prague–Czech Republic**. (05/2012)

- 13) Department of Mathematics “U. Dini”, **Florence–Italy**. (11/2012)
- 14) Department of Applied Mathematics “U. Dini”, **Pisa–Italy**. (11/2012)
- 15) University of Parma, **Parma–Italy**. (03/2013)
- 16) Waves and Stability in Continuous Media, **Levico Terme–Italy**. (06/2013)
- 17) CIME-EMS Summer School in applied mathematics, **Cetraro–Italy**. (07/2013)
- 18) University of Regensburg, **Regensburg–Germany**. (01/2014)
- 19) Recent Advances in PDEs and Applications, **Levico Terme–Italy**. (02/2014)
- 21) Leopoldina Jahrestagung, **Halle (Saale)–Germany**. (02/2014)
- 22) Austrian Numerical Analysis Days, **Vienna–Austria**. (05/2014)
- 23) European Finite Element Fair, **Vienna–Austria**. (05/2014)
- 24) Academy of Science, **Prague–Czech Republic**. (09/2014)
- 25) University of Surrey, **Guildford–UK**. (02/2015)
- 26) Duisburg-Essen University, **Essen–Germany**. (06/2015)
- 27) Equadiff 2015, **Lyon–France**. (07/2015)
- 28) University of Cologne, **Cologne–Germany**. (07/2015)
- 29) University of Osnabrück, **Osnabrück–Germany**. (07/2015)
- 30) Technical University, **Berlin–Germany**. (08/2015)
- 31) Eberhard Karls University, **Tübingen–Germany**. (04/2016)
- 32) Maxwell Institute Probability Day, **Edinburgh–UK**. (05/2016)
- 33) 9th Eur. Conference on Elliptic and Parabolic Problems, **Gaeta–Italy**. (05/2016)
- 34) Ruhr University, **Bochum–Germany**. (06/2016)
- 35) 4th Scottish PDE Colloquium, **Dundee–UK**. (06/2016)
- 36) University of York, **York–UK**. (01/2017)
- 37) University of Bielefeld, **Bielefeld–Germany**. (05/2017)
- 38) Equadiff 2017, **Bratislava–Slovakia**. (07/2017)
- 39) University of Strathclyde, **Glasgow–UK**. (11/2018)
- 40) Workshop on Fluid-Structure Interaction, **Milan–Italy**. (03/2019)
- 41) North-British Probability Seminar, **Edinburgh–UK**. (10/2019)

- 42) Monday's Nonstandard Seminar (online), **Warsau–Poland**. (01/2021)
- 43) Nonlinear Potential Theoretic Methods in Partial Differential Equations (online), **Banff–Canada**. (09/2021)